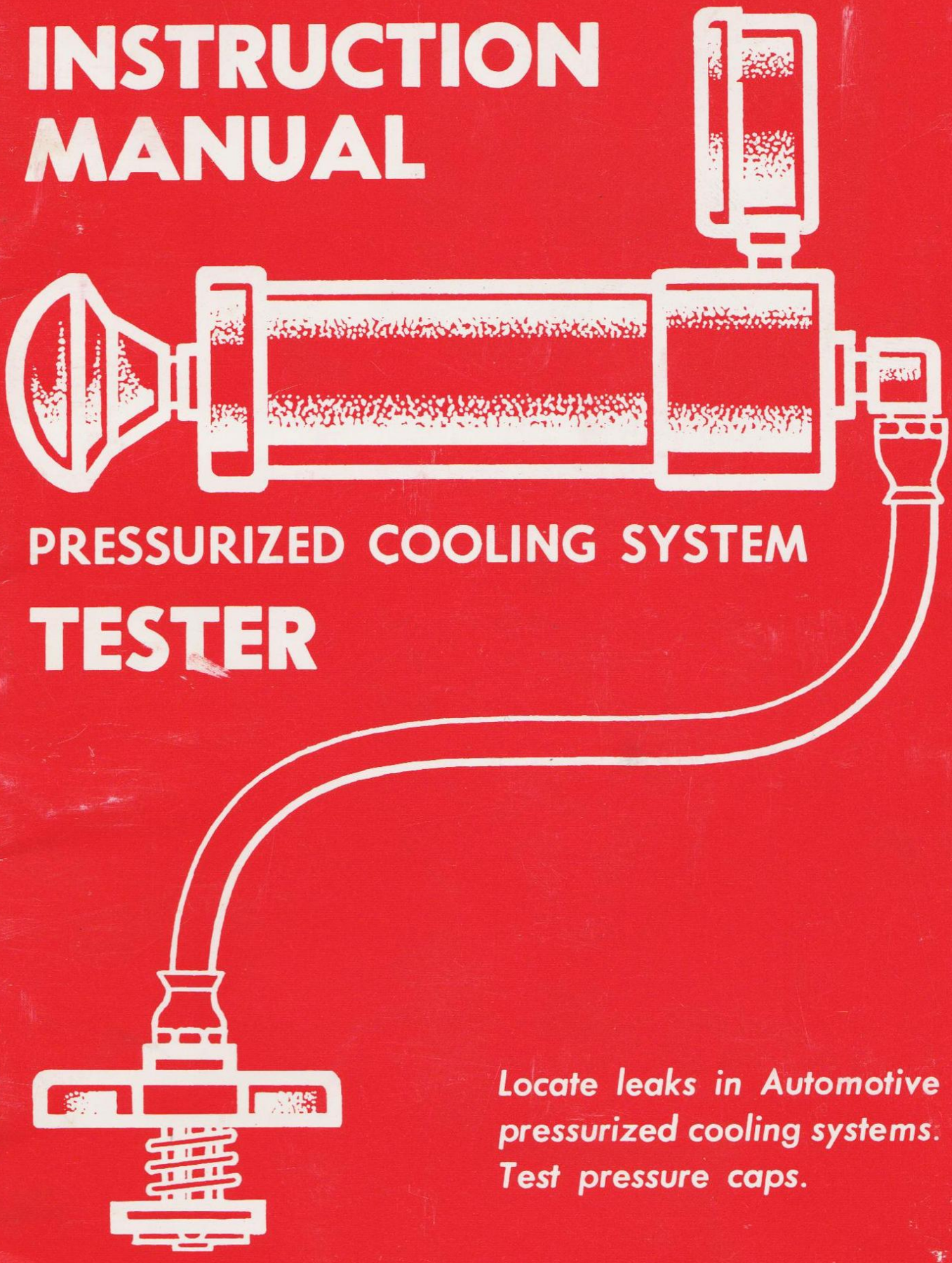
INSTRUCTION MANUAL



PRESSURIZED COOLING SYSTEM TESTER

Locate leaks in Automotive pressurized cooling systems. Test pressure caps.

STANT INC.

CONNERSVILLE, INDIANA, U.S.A.

JB-745-1

PRINTED IN U. S. A.

FOREWORD

A thorough understanding of the contents of this manual and the use of the Pressure Tester will enable you to vastly increase your profits from cooling system service.

By taking out the guesswork, you are enabled to service cooling systems **FASTER** and **BETTER.** You can also **SHOW** your **CUSTOMER** the **TRUE CONDITION** of the cooling system. You can sell needed parts **EASIER.**

Customers will appreciate the thorough manner in which you can service the cooling system — when you **SAVE YOUR CUSTOMER** from **TROUBLE ON THE ROAD**, YOU **PRESERVE HIM** as **YOUR CUSTOMER.**

Where the guaranteed winterizing plan is in effect, the use of the Pressure Tester is essential because it practically eliminates the chances of loss of coolant from leakage.

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PART I — THE OPERATION OF THE COOLING SYSTEM

THE NON-PRESSURE OR ATMOSPHERIC SYSTEM

In the atmospheric (non-pressure) system the boiling point of the coolant is determined by the amount of atmospheric pressure exerted upon it. For example, at sea level the water in the system will boil at 212 °F while at an altitude of 5,500 feet the water will boil at 202 °F or 10° lower than at sea level. As the altitude is increased, the boiling point falls lower.

The water pump develops a suction on the intake side which further reduces the atmospheric pressure at this point thus, although the car may be operating at a safe 180 °F, boiling occurs at the pump inlet causing expansion of the liquid coolant (vapor-lock) and slowing down circulation. Also, coolant is forced out of the overflow because of the expansion; the remaining smaller amount of coolant thus overheats more easily.

When alcohol or other volatile anti-freeze solutions are used, the boiling point of the coolant is lowered still more.

Clogged up water and air passages in the radiator core, overloaded cars, hot climates, high altitudes, and combinations of these conditions contribute to overheating.

When large capacity radiators having large frontal areas were in use and low compression, low horsepower engines did not develop the tremendous volume of heat of modern engines, there was an excess of cooling capacity. If systems were kept clean and in good mechanical condition, no troubles were experienced with these older cars.

With the advent of higher and higher horsepower in engines, smaller radiators (because of cost and styling limitations), higher operating temperatures, etc., much more heat developed with less radiation surface to dissipate it to the atmosphere. Cooling became a major problem.

The Pressurized Cooling System was engineered to eliminate these problems.

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THE PRESSURIZED COOLING SYSTEM AND RANGES OF PRESSURE CAPS

It has been found that pump efficiency is increased if the coolant is kept under pressure during operation. Each 4 pounds of pressure in the system increases the cooling efficiency approximately 10%.

Each pound increase in pressure raises the boiling point about 3 °F. Thus, water under 7 pounds pressure boils at 233 ° or 21 ° higher than at sea level.

The cooling efficiency is therefore proportionately increased at all altitudes and under all conditions.

By pressurizing the system, the loss of coolant (and volatile anti-freezes) by evaporation, surging and unnecessary boiling is eliminated; pump efficiency is increased and thus the coolant is prevented from boiling except under unnatural conditions such as a badly clogged radiator core, leakage, broken fan belt, compression or combustion leakage into the cooling system or similar defects.

Pressurization of the cooling system is accomplished by the use of a *special design filler neck* and *a Pressure Cap.* (A spring loaded cap that maintains a specified pressure within the system.) The filler neck (see Fig. 1) is made with a top sealing seat and a *lower inside sealing seat.* The overflow tube leads off from a point between these two seats. The Pressure Cap is equipped with a built-in pressure control (relief) valve which seals off the cooling system from the overflow tube and the atmosphere, thereby permitting the system to pressurize itself automatically as the coolant expands as it is heated. The pressure will not exceed the specified rating of the cap, providing the cap is functioning properly. The maximum cooling efficiency of the engine is reached at the pressure rating of the cap.

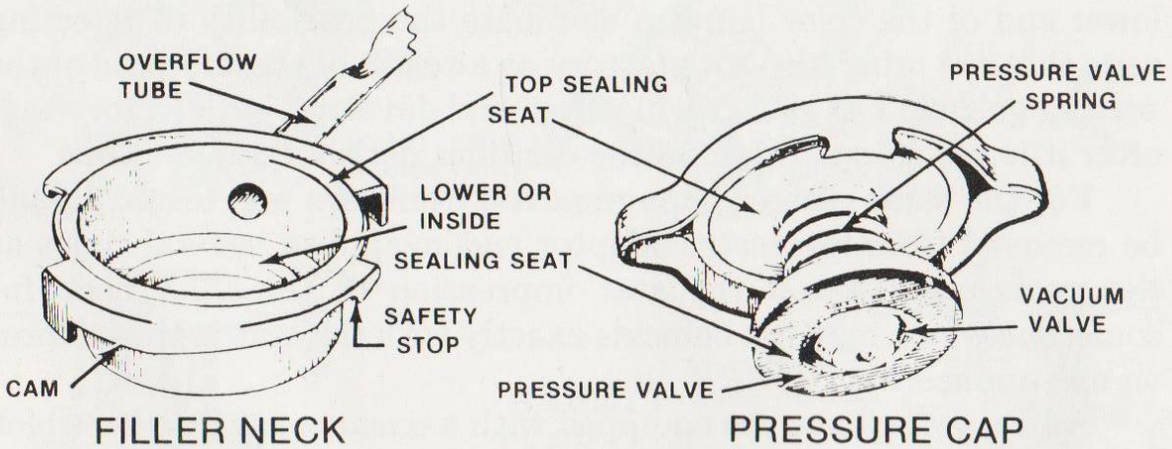

Fig. 1

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The Pressure Cap functions as a *safety valve* to keep the pessure within the desired safe limits as designed by the car manufacturer.

Practically all vehicles built in recent years use *one of four rated pressures.* The filler cap is stamped or otherwise marked with a figure indicating the approximate operating pressure. (See Fig. 2.)

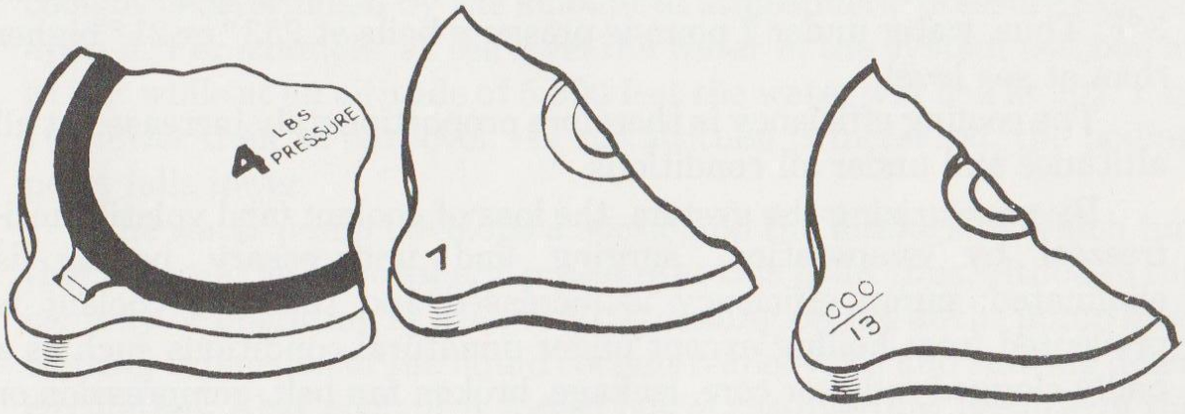

Fig. 2

Pressure Caps are designed to operate within a predetermined range thus,

Pressure Marking on Cap	**Operating Range**
4 (lbs.)	3¼ lbs. 4½ lbs.
7 (lbs.)	6½ lbs. to 8 lbs.
13-14 (lbs.)	12 lbs. to 16 lbs.
15-17 (lbs.)	14 lbs. to 18 lbs.

This means that the pressure valve *should* **NOT OPEN** *below the low limit* of the range (i.e. 3¼ lbs. for 4 lb. cap) but **MUST OPEN** *at or below the top limit* of the range (i.e. 4½ lbs. for a 4 lb. cap).

A slight allowance is made on the gauge dial of the Tester at the lower end of the color band to eliminate the possibility of rejecting caps that are otherwise satisfactory as a result of the newness of the seating gasket. The gasket will soften and develop a satisfactory seat after it is put in operation on the car filler neck for a short time.

For the same reason, caps removed from cars and tested should be removed from the tester adaptor and re-applied several times as the gasket will retain the seat impression of the filler neck for sometime which may not coincide exactly with the seat in the adaptor on one application.

All Pressure Caps are equipped with a *vacuum relief valve* which open automatically as the car engine is cooling off to prevent the formation of a vacuum in the system. This prevents the collapse of radiator upper and lower tanks, hose, etc.

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TYPES OF PRESSURE CAPS

Constant pressure type caps (Fig. 3) have a light spring which holds the vacuum valve in a closed position which seals the cap. This type cap causes the system to become pressurized as the coolant expands each time the engine is warmed up.

Pressure-Vent type caps (Fig. 4) (as used on the Chrysler family of cars and American Motors and some other makes) are equipped with a loose vacuum valve having small precisely determined weight that holds this valve in an open position at atmospheric pressure. This open valve permits normal breathing of the cooling system at all times except when abnormal conditions cause quick build up of temperature or boiling. The valve will automatically close upon a predetermined rate of flow of vapor; thereafter, the cap operates the same as a full pressure type cap until the engine is stopped and pressure drops to zero.

The design of this Tester automatically holds both the Constant-Pressure Cap and the Pressure-Vent Cap in the correct position for testing.

Safety Type caps. (See Fig. 5) Safety type caps are available in constant pressure and pressure-vent design. These caps are equipped with a manually operated lever which lifts the pressure valve off its sealing seat allowing pressure to escape safely through the overflow tube. It is advisable to allow a motor to idle or rest a few minutes after highway driving before lifting lever to avoid excessive loss of coolant, especially with costly anti-freezes. Latest model safety cap has an interlock which prevents turning of the cap until the lever if lifted.

These caps are used on the tester in the same manner as regular pressure caps.

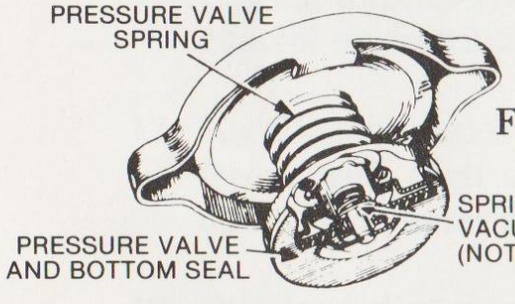


Fig. 3

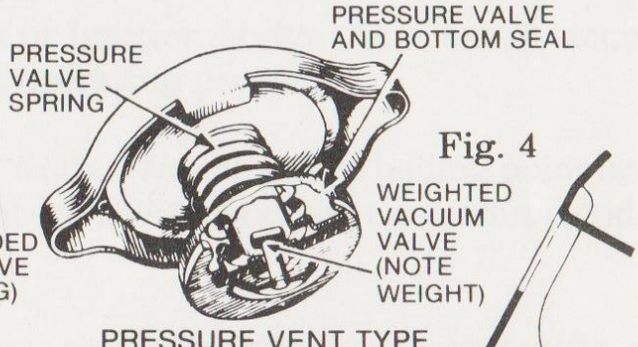
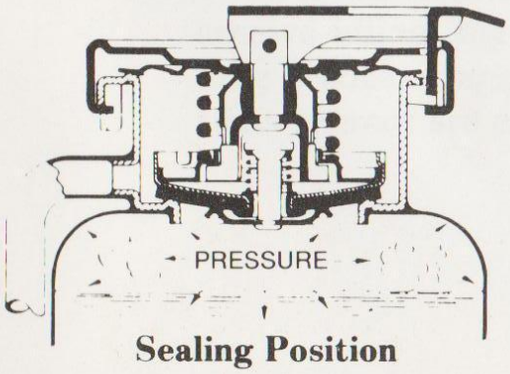


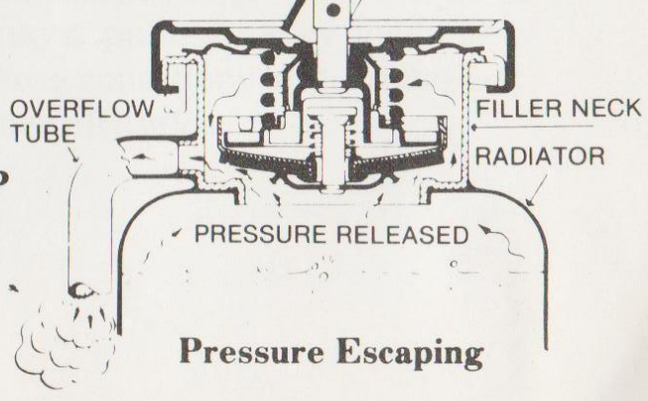
Fig. 4

PRESSURE VENT TYPE



Sealing Position

SAFETY TYPE CAP
Fig. 5



Pressure Escaping

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DEFECTIVE CONDITIONS THAT CAN CAUSE PRESSURE CAP LEAKAGE

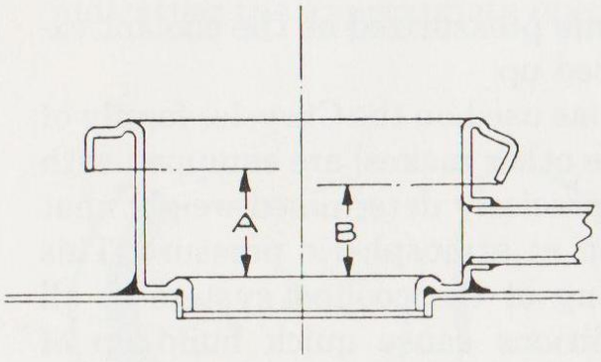

Fig. 6

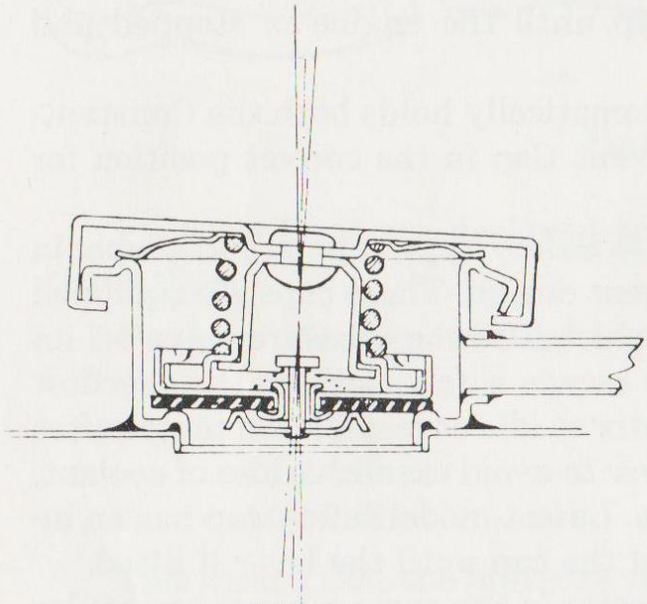

Fig. 7

Dimension "A" from cam rest point to inside sealing seat must not be distorted. Normal wear will not effect cams sufficient amount to effect seal of cap. But *bent cams can cause trouble.*

If *one* cam is bent down ("B in Fig. 6) this will cause cocking of the cap on the neck which effects the compression of the pressure valve spring (See Fig. 7) causing cap to leak or hold no pressure.

If *both cams* are bent down equally, the cap will seal but at a *high pressure* because the pressure valve spring is compressed more.

Pressure will be *less* if cams are bent upwardly or worn excessively.

If Pressure Cap ears are bent the same conditions apply.

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ENGINE OVERHEATING THROUGH WATER LOSS ONLY

1. Inoperative Pressure Cap.

2. Defective thermostat and gasket leakage at thermostat housing.

3. Loose, slipping or missing fan belt.

4. Radiator overfilled, defective radiator. Clogged water passage in radiator core, engine water jackets, water distribution tube in block.

5. Loose hose connections or hose obstructed because of interior deterioration or collapsed at a bend point.

6. Leaking or defective water pump.

7. Bent or missing fan blades.

8. Air passages through radiator core plugged with insects, leaves, (blow clear with air pressure or garden hose.)

9. Internally blown or damaged head gasket, loose head bolts, or warped or cracked cylinder head or engine block.

10. Wrong grade of gasoline or low oil level.

11. Engine improperly timed or ignition faulty. Automatic vacuum control or distributor not operating properly.

12. Insufficient anti-freeze in winter (freezing), low boiling point anti-freeze with high temperature thermostat, or non-recommended anti-freeze material.

13. Overloaded engine, frequent starts and stops in heavy traffic, excessive idling, high speeds on hot days, pulling heavy loads or long grades, dragging brakes. All these conditions and combinations thereof are emphasized at higher altitudes.

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PART II – PRESSURE TESTER OPERATING INSTRUCTIONS

TESTING THE PRESSURE CAP

1. Carefully remove cap from car (on safety type caps first lift lever to release pressure) and check the cap pressure as marked on the top of the cap. Compare it with recommended rating of car.

2. Make sure all parts and seating surfaces of cap and adapter are clean. On Safety type caps be sure lever is in down or closed position.

3. On new caps, wet the rubber gasket in water. **NOTE:** Due to the newness of the gasket, it may be necessary to remove the pressure cap several times to get a proper sealing seat on the gasket. The gasket softens in actual car operation and will work perfectly.

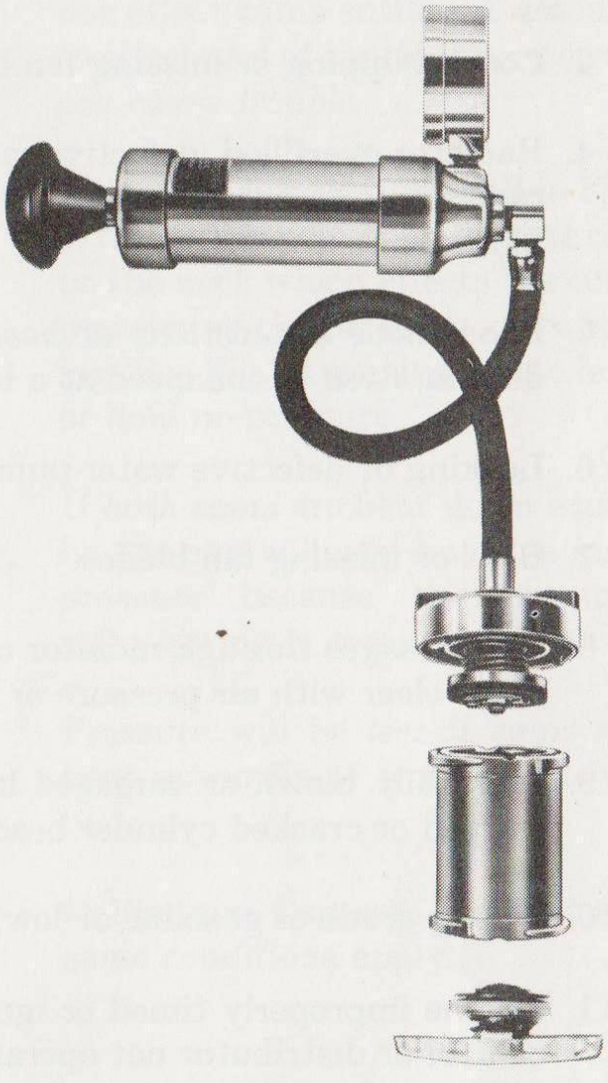

Fig. 8

4. Apply the pressure cap to be tested as shown in Fig. 8 to one end of adapter, attach opposite end of the adapter to the Pressure Tester by pressing together and rotating adapter until the locking ears contact the stops on the adapter cams.

5. Hold Tester with gauge facing you as shown (Fig. 9).

6. Operate the pump until needle reaches its highest point.

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Fig. 9

NOTE: Remember that a cap that has been in use on a radiator for some time will have a slight seat impression in the gasket; therefore, the cap (if it leaks) should be removed and applied several times to the adapter to be sure that leakage is not caused by the impression not seating properly. After the cap is reinstalled on the car, the continuous spring pressure will reseat the gasket properly in a short time.

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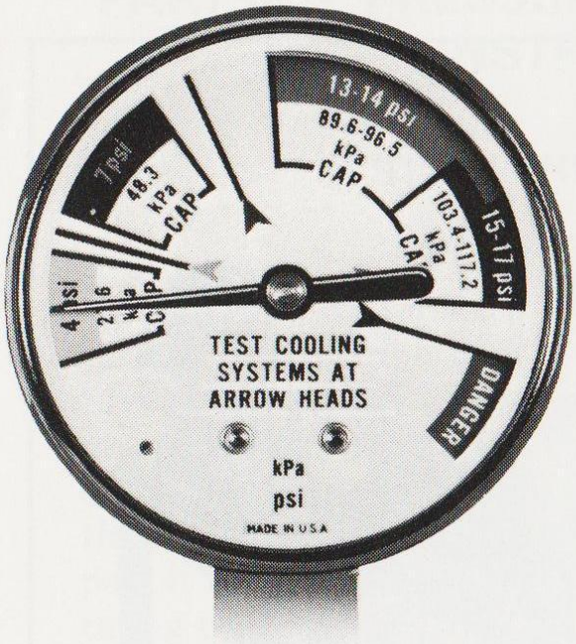
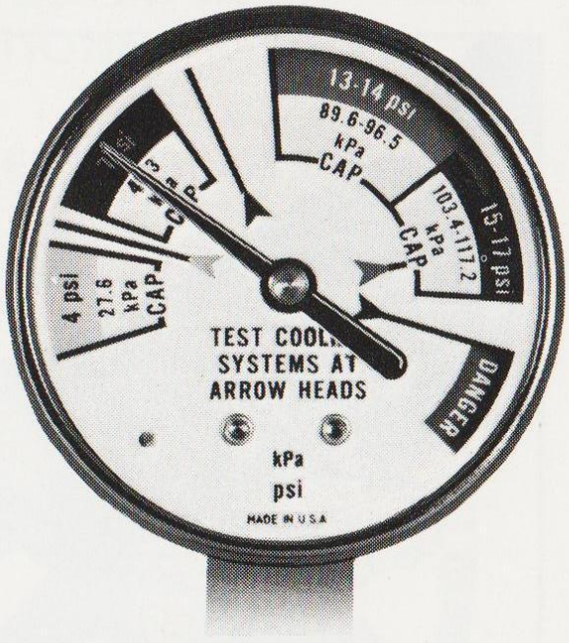
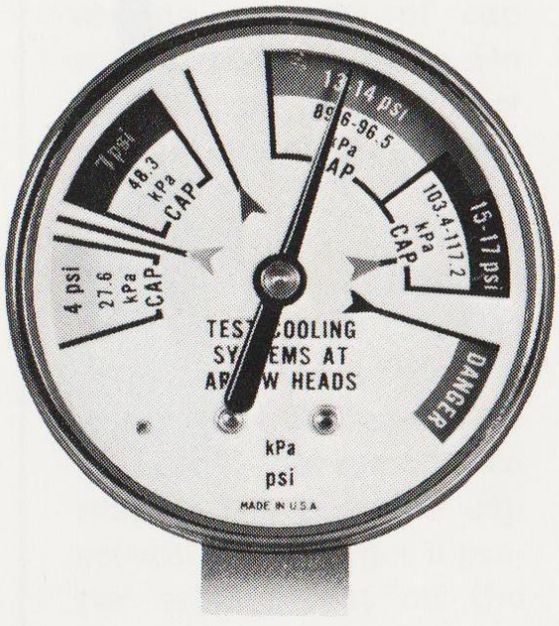


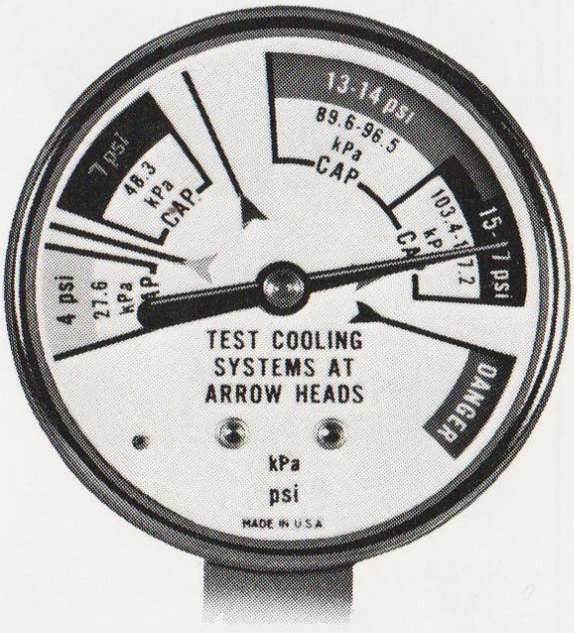
4 lb. CAP



7 lb. CAP



13-14 lb. CAP



15-17 lb. CAP

Fig. 10

READING THE GAUGE

Stop pumping when the valve opens and read the gauge (See Fig. 10) as follows: The gauge hand must be within the proper color band for the pressure rating of the cap being tested when the pressure valve opens. The cap is satisfactory when the pressure holds steady or falls very slowly, but holds within the band for 30 seconds or more. If the gauge hand falls comparatively fast which indicates serious leakage, *reject the pressure cap.*

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TESTING THE COOLING SYSTEM

1. Carefully remove the radiator pressure cap from the filler neck.
2. Make sure water is at recommended level in radiator.
3. Wipe out the inside of the filler neck. Examine the lower inside sealing seat of the filler neck for nicks, dirt and solder bumps.
4. Inspect the overflow tube for dents or internal obstuction. Run a wire through the tube to be sure it is clear. Pressure released by the pressure cap during operation of the car must pass through this tube. An obstructed tube may cause the radiator or some portion of the cooling system to burst if pressure builds up excessively.
5. Inspect the cams on the outside of the filler neck. If cams are bent down or up, the seating of the pressure cap valve and the Tester seal will be affected. Bent cams can be reformed if it is done carefully. **DO NOT BREAK THE SOLDER JOINT BETWEEN THE NECK AND THE RADIATOR TOP TANK.** Have the filler neck replaced by a reputable radiator repair service if it is in bad condition.

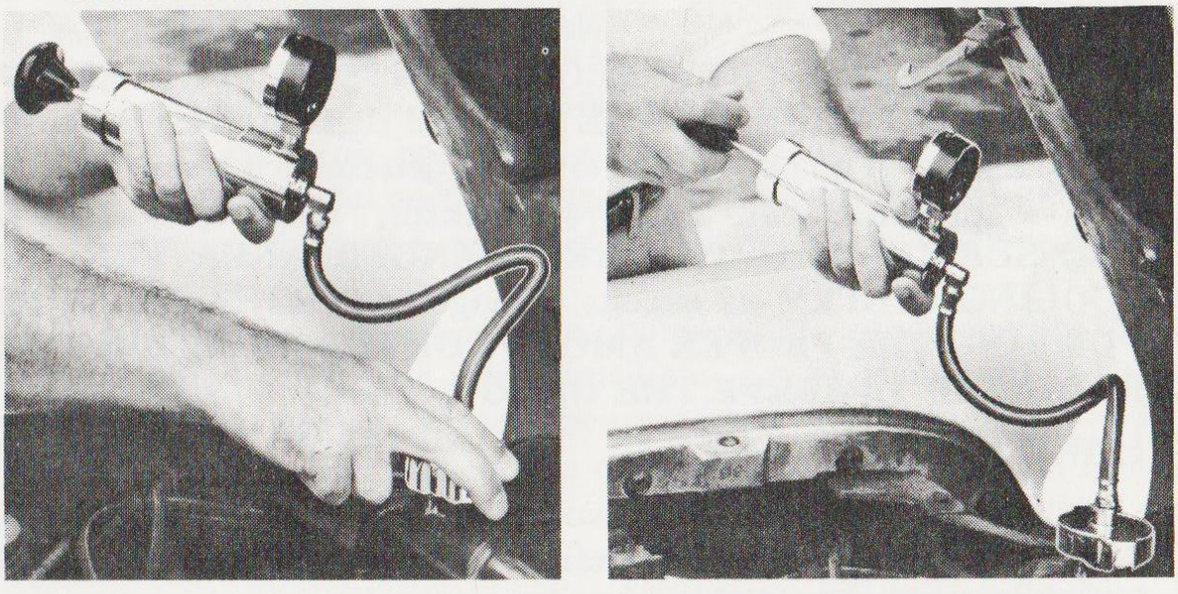

Fig. 11

6. Attach the Pressure Tester to the filler neck as shown. Set the Tester on the filler neck with the locking ears in line with the entrance notches of the filler neck. Press down slightly and rotate clockwise until the locking ears are stopped by the stop lugs on the filler neck. **DO NOT FORCE.**

NOTE: USE RUBBER SPACER WASHER IN 1" DEEP RADIATOR NECKS (SUCH AS ON MANY FOREIGN CARS AND DOMESTIC FARM TRACTORS.)

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Check current published specifications to determine the proper pressure for each system.

7. After attaching the Tester to the radiator filler neck, operate the pump *until the indicator hand on the gauge reaches the proper arrow just beyond the end of each color band.* (See following procedure.)

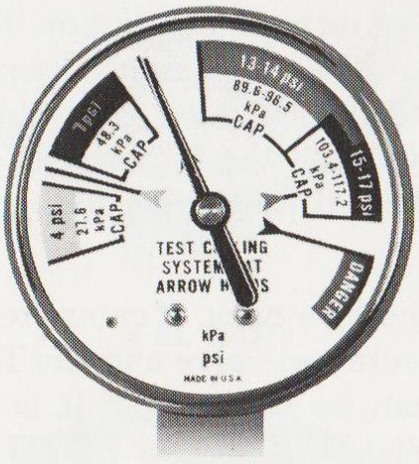

Fig. 12

4 POUND SYSTEM should be pumped up to the line indicated by the **YELLOW ARROWHEAD. DO NOT EXCEED THIS POINT.**

7 POUND SYSTEM should be pumped up to the line indicated by the **GREEN ARROWHEAD. DO NOT EXCEED THIS POINT.**

13 - 14 POUND SYSTEM should be pumped up to the line indicated by the **BLUE ARROWHEAD. DO NOT EXCEED THIS POINT.**

15 - 17 POUND SYSTEM should be pumped up to the line indicated by the **BLACK ARROWHEAD. DO NOT EXCEED THIS POINT.**

NEVER EXCEED THE ARROW POINTS OF THE RECOMMENDED PRESSURE OF THE SYSTEM BEING TESTED as it is not necessary to go beyond the arrow to determine if leaks exist. Excessive pressure can rupture radiator, hose, etc. **NEVER PRESSURIZE INTO THE RED DANGER AREA FOR ANY COOLING SYSTEM** as serious damage to it may occur. **AFTER PUMPING THE PROPER AMOUNT OF PRESSURE INTO THE RADIATOR, OBSERVE THE GAUGE.**

HAND HOLDS STEADY

If the hand holds steady for two minutes, there are no serious leaks in the system. Nevertheless examine all points for seepage or slight leakage with a flashlight.

HAND DROPS SLOWLY

Indicates the presence of small leaks or seepage. Check radiator, hose, gaskets, and heater. Very tiny leaks in the radiator core may be stopped by a good quality stop leak. After repairing leaks, the system should be rechecked for minor leaks as these will quickly become major leaks. If radiator hose swells excessively while testing system, it indicates it is in a weakened condition and should be replaced.

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HAND DROPS QUICKLY

Indicates that serious leakage is present. Large radiator leaks should be repaired by a reputable radiator repairman.

8. **INTERIOR LEAKAGE**

   A. **WHEN THE GAUGE SHOWS A PRESSURE DROP AND THERE IS NO VISIBLE LEAKAGE.** Remove tester and replace pressure cap. Run the engine to churn up the oil and examine the dipstick for water globules. Another method would be to remove the crankcase drain plug and drain out a small amount of oil; water being the heaviest should drain out first.

   Transmission intercoolers are also possible sources of leakage. Check transmission dipstick for water globules.

   B. *Compression or combustion leakage* into the cooling system can be detected as follows:

      1. Carefully remove the pressure cap and apply the Pressure Tester to the filler neck when the engine is cool.
      2. Let engine idle and warm up to normal operating temperature.

         WATCH CAREFULLY — IF GAUGE INDICATES PRESSURE IS BUILDING UP FAST — RELEASE PRESSURE BY TURNING OFF ENGINE AND CAREFULLY REMOVING TESTER. (See 9.)

         Do not allow pressure to build up past arrow indicating maximum for each system. When pressure builds up fast, a leak exists as a result of a blown gasket. Replace head gasket.
      3. *If pressure does not build up immediately* then operate the Pressure Tester pump until the gauge reads within the range for the system being tested. If the gauge hand vibrates, this indicates a compression or combustion leak into the cooling system.

         Location of compression leak is determined by shorting out each spark plug; gauge hand will stop or decrease vibrating when the spark plug of the leaking cylinder is shorted out. Retest with Pressure Tester after repairing leak.

9. **REMOVE TESTER FROM RADIATOR NECK.**

Release pressure in cooling system by pressing stem to one side (Fig. 13), then remove Tester from filler neck.

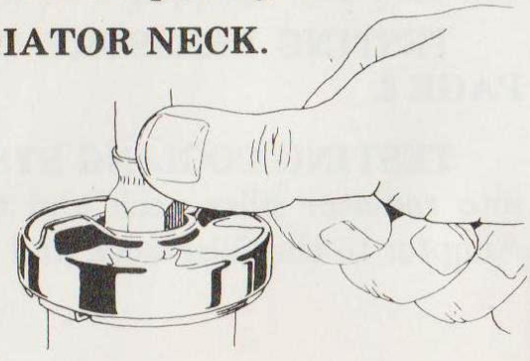

Fig. 13

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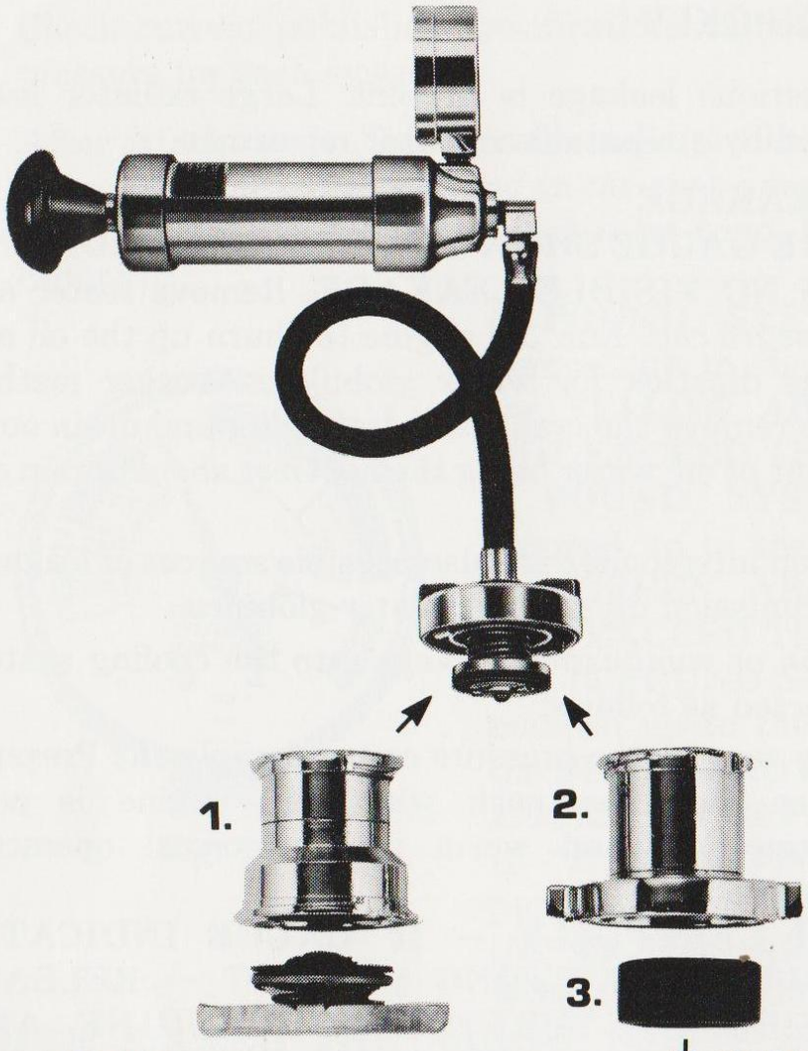

TESTING
TRUCK PRESSURE CAP

TO RADIATOR FILLER NECK
FOR TESTING
TRUCK COOLING SYSTEM

Fig. 14

TRUCK ADAPTOR KIT

In order to fit the popular truck size filler necks ($2\frac{9}{16}$" outside diameter x $\frac{3}{4}$" deep) and the Pressure Caps for that size, it is necessary to use the Truck Adaptor Kit. This Kit is made up of the following:

1. Pressure Cap Adaptor
2. Radiator Filler Neck Adaptor **(Illustrated above)**
3. Rubber Filler Neck Plug

TESTING PRESSURE CAP — FOLLOW PROCEDURE ON PAGE 8.

TESTING COOLING SYSTEM — Drop rubber filler neck plug into radiator filler neck and then attach the Radiator Filler Neck Adaptor to the filler neck and follow procedure on page 11.

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CARE OF THE PRESSURE TESTER

This is an *Accurate Instrument — Treat it as such.* Its usefulness depends on its accuracy, therefore, do not drop it or use it roughly.

With reasonable care this instrument will give years of dependable service.

Three or four drops of light oil in the pump air inlet occasionally, to keep the leather piston flexible, is all that is necessary. Keep the Tester and adaptors in the case when not in use.

REPAIRING THE TESTER

CHECK VALVE

1. Unscrew the pump tube from the tester body. The end cap is pressed on the tube permanently; do not attempt to remove.

2. Lift the check valve and gasket out of the tester body. If it requires cleaning, clean it carefully and replace.

3. If check valve or gasket is worn or damaged, a replacement valve is available (Part #255-3).

4. After dropping check valve unit into proper position, screw pump tube in place tightly by hand.

FLEXIBLE HOSE

A damaged or worn flexible hose may be replaced with Wetherhead #81430-14" Universal Oil Filter Line and #48x4 SAE male connector. Use any good thread sealing compound and tighten securely.

Repair parts may be ordered through your supplier. Use part numbers shown on page 16.

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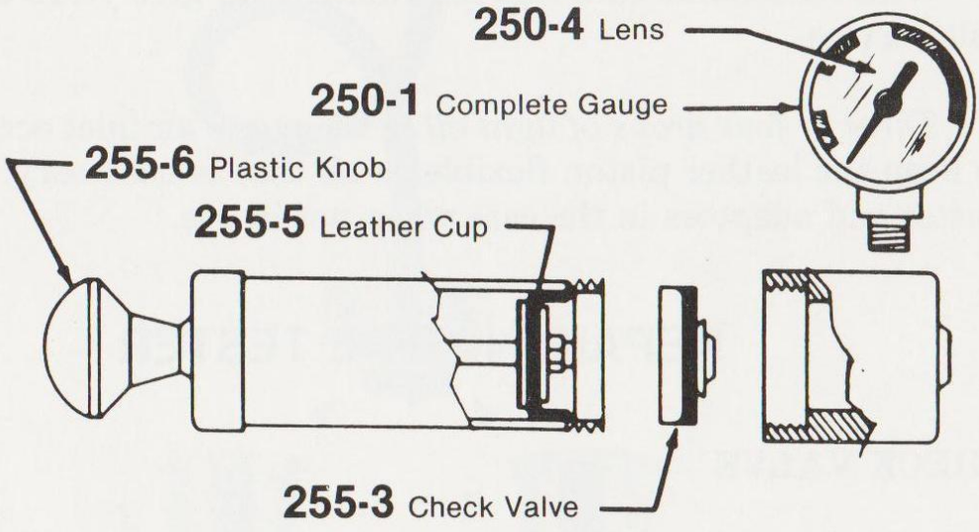
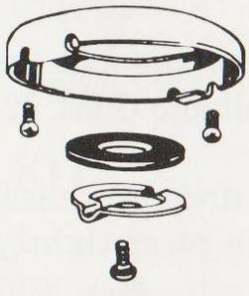


255-7A HOSE AND HEAD KIT



255-8 HEAD REPAIR KIT

REPAIR PARTS NUMBERS

Fig. 16

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NOTE

After the selection of proper pressure cap from current published specifications, always test the cooling system with Tester at arrow just above the pressure range indicated on the Pressure Tester dial. (Ref. see page 12, paragraph 7 in manual).

LIMITED WARRANTY

This Testing Instrument has been thoroughly tested by the manufacturer and every care is taken to insure the Tester to be perfect in every respect.

This Pressure Testing Instrument is warranted for a period of six months from date of purchase, by the original purchaser, against defective material and workmanship but not against damage caused by tampering, negligence, misuse or abusive handling which might impair its proper operation.

The manufacturer will repair free of charge all defective parts if Tester is returned within the warranty period. Date of purchase must be validated by a copy of the original purchase order or invoice.

A reasonable charge will be made for repairs or replacement of parts where examination indicates damage due to causes other than defective material and workmanship.

STANT INC.
Connersville, Indiana 47331

The manufacturer of this Instrument reserves the right to make improvements, changes in design and materials at any time without incurring any obligation on units previously sold.

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